



# **Changes to PA System: CCA to CRA**

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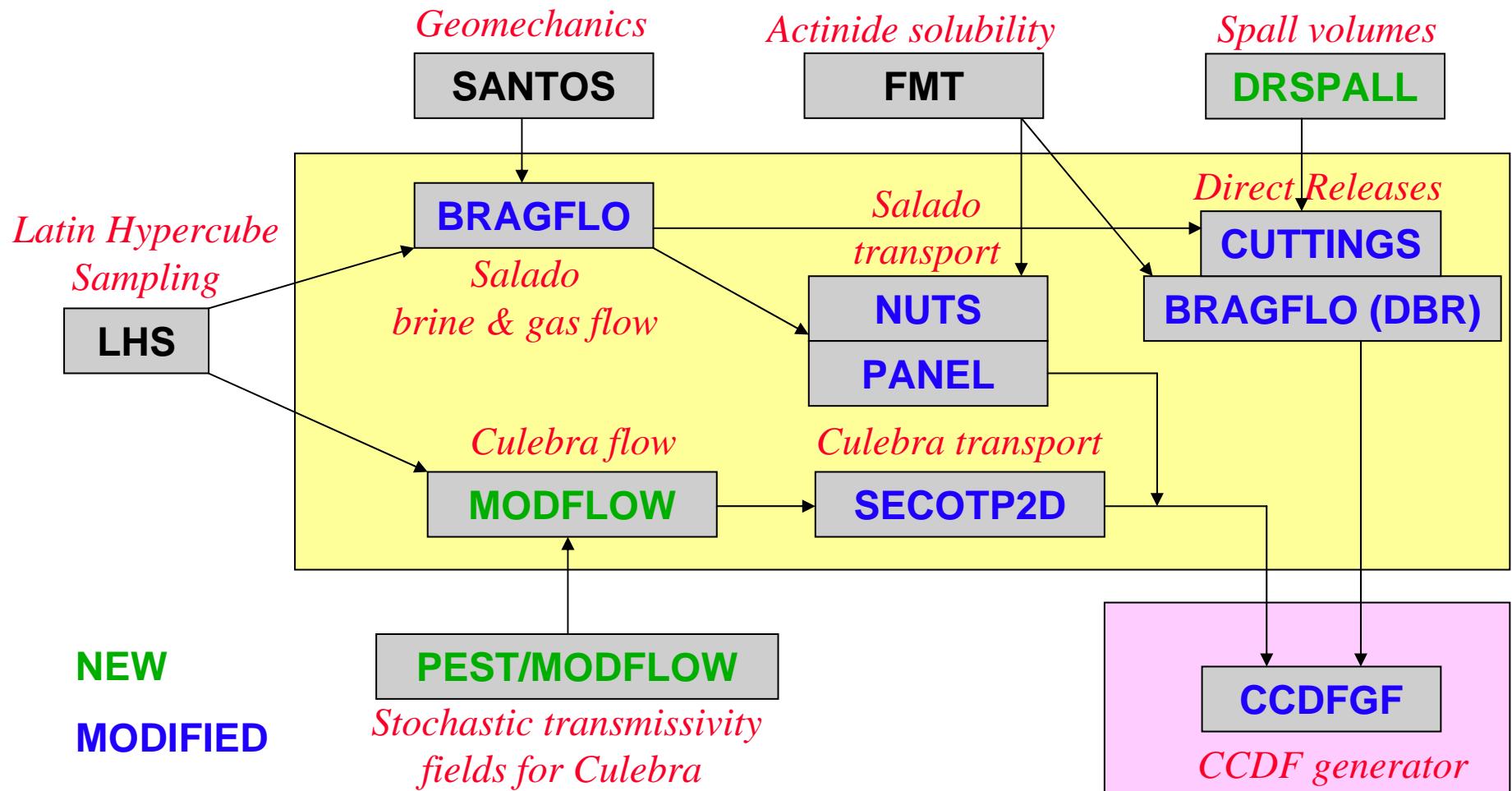


# **Major Components of PA System**

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- **Codes (computational models)**
- **Platforms**
  - OpenVMS Alpha Cluster (modified from CCA)
  - Linux PC clusters (new for CRA)
  - Linux PC (for AMW, not used for CRA)
  - Tru64 Alpha (for AMW, not used for CRA)
- **Parameter database**

# Major PA Codes in the CRA



# Changes to Major Codes

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Code	CCA	PAVT	CRA
BRAGFLO	4.00	4.10	5.00 (I/O)
NUTS	2.02	2.05	2.05A (dimen.)
PANEL	3.60	3.60	4.02 (add. param.)
GRASP-INV	2.01	2.01	N/A (replaced)
SECOFL2D	3.03	3.03	N/A (replaced)
PEST	N/A	N/A	5.51 (new)
MODFLOW2K	N/A	N/A	1.6 (new)
SECOTP2D	1.41	1.41	1.41A (dimen.)
CUTTINGS	5.03	5.04	5.10 (DRSPALL)
DRSPALL	N/A	N/A	1.00 (new)
BRAGFLO_DBR	4.01	BRAGFLO 4.10	BRAGFLO 5.00
CCDFGF	2.00	3.00	5.00A (rewrite)



# Platforms – OpenVMS Alpha Cluster

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- **OpenVMS Alpha cluster for the CCA**
  - 10 x Alpha 2100s
- **OpenVMS Alpha cluster for the CRA**
  - 2 x ES40 (BTO and CSN)
  - 2 x ES45 (CCR and ELO)
  - 1 x 8400 (MCH)
  - One Alpha 2100 (Elton) retained as EPA node
- **Hosts most computation models (except SANTOS, FMT, PEST and MODFLOW)**



# Operating System for OpenVMS Cluster

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- CCA: OpenVMS 6.1
  - Updated to OpenVMS 7.1 June 1999
  - Updated to OpenVMS 7.2 in June 2000
  - Updated to OpenVMS 7.3-1 in August 2002
- CRA: OpenVMS 7.3-1
- All codes tested on new OS and hardware
  - OpenVMS 7.3-1 on ES40 approved June 12, 2003
  - Approval of ES45 and 8400 pending



## Platforms – Linux PC clusters

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- Two PC clusters of 16 machines each
  - allman
  - lylin
- Host MODFLOW/PEST codes to perform Culebra flow field calculation
- MODFLOW/PEST qualified according to NP 19-1



## Platform – Linux PC and Tru64 Alpha

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- Single standalone PC (warthog) supports SANTOS for legacy work
- Tru64 Alpha (BOC) supports SANTOS for current work (AMW analyses)
- Not used for CRA – SANTOS results unchanged from CCA



# Parameters

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- CCA: WIPP Database using INGRES
- CRA: PA Parameter Database (PAPDB) using SQL server
- Parameters migrated in phases:
  - From INGRES to SQL 7 (both on Alpha server) (1998)
  - From SQL 7 (Alpha) to SQL 2000 (Intel) (2001)
  - Data migrated to new data model (PAPDB) (2002)
  - Additional parameters migrated during Salado Flow Peer Review (shaft, etc.) (2002)
- Migration from CCA to PAPDB (with shaft parameters)  
approved May 15, 2003
- Subsequent parameter changes for the CRA (inventory, spallings, etc.) under review



# Parameter Changes Since CCA

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- Adopt PAVT values

- Long-term borehole permeability
- Borehole plug permeability
- DRZ permeability
- Effectiveness of passive institutional controls
- Waste shear strength
- Inundated steel corrosion rate
- Probability of hitting a brine pocket
- Drill string angular velocity
- Castile brine rock compressibility
- Castile brine pocket permeability
- Waste permeability

- Incorporate corrections

- Matrix distribution coefficients
- Compressibility (bulk vs. pore)
- Correlation between Castile compressibility and Castile porosity

- Changes for updated inventory

- Other changes in value

- Solubilities (recalculated)
- Drilling rate (updated)

- New parameters

- Panel closures
- Simplified shaft model
- DRSPALL parameters
- Hardwired values from BRAGFLO, CCDFGF
  - Gas binary interaction parameters
  - Volume fractions of waste